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Dimensions and Requirements [PGD 32: Cutting tools]

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(दूसरा पुनरीक्षण)

Indian Standard
METAL CUTTING BANDSAW BLADE —
SPECIFICATION

PART 3 DIMENSIONS AND OTHER REQUIREMENTS

(Second Revision)

ICS 25.100.20

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BUREAU OF INDIAN STANDARDS
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FOREWORD

This Indian Standard (Part 3) (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Milling Cutters, Saws, Gear Cutting Tools and Broaches Sectional Committee had been approved by the Medical Instruments, General and Production Engineering Division Council.

This standard was first published in 1969 and was revised in 1982 to align it with ISO Standard. This revision includes the requirements of earlier amendments and cutting test for evaluating performance of the bandsaw blade. IS 5030 is published in three parts. While this standard covers the dimensions and other requirements of bandsaw blade, the other two parts in this series are:

(Part 1) : 1982 Specification for metal cutting bandsaw blades: Part 1 Definitions and terminology (*first revision*)

(Part 2) : 1982 Specification for metal cutting bandsaw blades: Part 2 Tolerances (*first revision*)

Assistance has been derived from the following International Standard while drafting this standard:

ISO 4875-3 : 1978 Metal cutting bandsaw blades — Part 3 : Characteristics related to each type of blade

Following are the other Indian Standards in this series:

<i>IS No.</i>	<i>Title</i>
5031 : 1992	Saws — Metal slitting (<i>second revision</i>)
10140 : 1982	Bandsaw blades for woodworking
11741 : 1986	Circular saws for woodworking

This standard is technically equivalent to ISO 4875-3 : 1978. However following are the additional requirements included in this standard which are not covered in the ISO Standard:

- a) Type A is sub divided in two types, Type A1 and Type A2.
- b) Some of the additional sizes have been included which are for use in Indian Industries.
- c) Material and hardness has been specified for bandsaw blades.
- d) General requirements, workmanship and finish, protective coating, designation, sampling, marking and packaging are included.
- e) Flexibility test and cutting test are included.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

**METAL CUTTING BANDSAW BLADE —
SPECIFICATION**

PART 3 DIMENSIONS AND OTHER REQUIREMENTS

(Second Revision)

1 SCOPE

This standard (Part 3) covers the dimensions and other requirements for various types of bandsaw blades for metal cutting based on the function of the material used for their manufacture. The dimensions specified in this standard have been selected from those ranges as given in IS 5030 (Part 2).

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
5030	Specification for metal cutting bandsaw blades:
(Part 1) : 1982	Definitions and terminology
(Part 2) : 1982	Tolerances
7226 : 1974	Cold rolled medium, high carbon and low alloy steel strip for general engineering purposes
7291 : 1981	High speed tool steels (<i>first revision</i>)
7778 (Part 8) : 2003	Small tools sampling inspection procedure : Part 8 Saws (<i>first revision</i>)
4905 : 1968	Methods for random sampling

3 TERMINOLOGY

Terms and definitions used in this standard shall be according to IS 5030 (Part 1).

4 TYPES

The blades shall be of the following types:

4.1 Type A Carbon Steel Bandsaw Blades

The blades made of low alloy steel having 1.0 to

1.5 percent of carbon. The combination of manganese, silicon and chromium contents shall not be less than 0.5 percent. These blades shall be of following two types:

- a) *Type A1* — Blades having hard edge and flexible back.
- b) *Type A2* — Blades having hard edge and tempered back.

4.2 Type B Intermediate Steel Bandsaw Blades

The blades made of steel which is between carbon and high speed steel in alloy content, that is, a high carbon steel having 0.8 to 1.25 percent carbon, alloyed with chromium, vanadium, molybdenum or tungsten in an amount totaling more than 8 but less than 14 percent of these carbide forming elements.

4.3 Type C Composite Steel Bandsaw Blades

The blades made with a cutting edge of different material (normally high speed steel) from that of the back, the edge being joined to a backing of low alloy steel.

4.4 Type D Friction Cutting Bandsaw Blades

The blades made of fatigue-resistant steel for cutting by heat resulting from friction (The primary functions of the teeth are, therefore, to generate heat needed and to scoop in the air needed to support combustion. Friction saws are usually run at speeds in excess of 40 metres per second on machines with adequate shielding).

NOTES

1 Unless otherwise specified, the low alloy steel coil shall be of designation 120 Cr35 or 110 Cr35W2 according to IS 7226 or equivalent, in which case the major constituents shall be specified by the manufacturer.

2 Unless otherwise specified, the high speed steel shall be of designation XT87W6Mo5Cr4V2 according to IS 7291 or equivalent, in which case the major constituents shall be specified by the manufacturer.

5 DIMENSIONS (see Fig. 1)

5.1 For Type A

Carbon steel bandsaw blades.

5.1.1 Type A1

Blades having hard edge and flexible back shall have the following dimensions:

All dimensions in millimetres.

Width <i>b</i>	Thickness <i>t</i>	<i>Pitch P for</i>			
		Regular Tooth		Skip Tooth	Hook Tooth
		Raker set	Wavy set		
(1)	(2)	(3)	(4)	(5)	(6)
3.15	0.63	1.4 1.8	0.8 1.0 1.4	—	—
4.75	0.63	1.4 1.8 2.5	1.0 1.4	—	—
6.3	0.63	1.0 1.4 1.8 2.5	0.8 1.0 1.4	4.0 6.3	4.0 6.3
8.0	0.63	1.0 1.4 1.8 2.5 3.15	0.8 1.0 1.4	6.3	—
9.5	0.63	1.0 1.4 1.8 2.5 3.15	1.0 1.4	6.3 8.0	4.0 6.3 8.0
12.5	0.63	1.4 1.8 2.5 3.15 4.0	1.0 1.4	6.3 8.0	4.0 6.3 8.0
16.0	0.80	1.8 2.5 3.15	1.0 1.4	4.0 6.3	4.0 6.3
19.0	0.80	1.8 2.5 3.15 4.0	1.0 1.4	4.0 8.0	4.0 8.0
25.0	0.90	1.8 2.5 3.15 4.0	1.0	8.0	8.0 12.5
31.5	1.06	3.15 4.0	—	—	8.0
37.5	1.25	4.0 6.3	—	—	8.0

5.1.2 Type A2

Blades having hard edge and tempered back shall have the following dimensions:

All dimensions in millimetres.

Width <i>b</i>	Thickness <i>t</i>	<i>Pitch P</i> for			
		Regular Tooth		Skip Tooth	Hook Tooth
		Raker set	Wavy set		
(1)	(2)	(3)	(4)	(5)	(6)
4.75	0.63	1.4 1.8 2.5	—	—	—
6.3	0.63	1.0 1.4 1.8 2.5	0.8 1.0 1.4	4.0 6.3	4.0 6.3
9.5	0.63	1.4 1.8 2.5 3.15	1.0	6.3 8.0	4.0 6.3 8.0
12.5	0.63	1.4 1.8 2.5 3.15 4.0	1.0	6.3 8.0	4.0 6.3 8.0
16.0	0.80	1.8 2.5 3.15	—	—	—
19.0	0.80	1.8 2.5 3.15 4.0	1.0 1.8 2.5	4.0 8.0	4.0 8.0
25.0	0.90	1.8 2.5 3.15 4.0	1.0	8.0	8.0 12.5

5.2 For Type B

Intermediate steel bandsaw blades shall have the following dimensions:

All dimensions in millimetres.

Width <i>b</i>	Thickness <i>t</i>	Pitch <i>P</i> for Regular Tooth	
		Raker Set	Wavy Set
(1)	(2)	(3)	(4)
12.5	0.63	1.4 2.5	1.4
19.0	0.80	1.4 2.5 3.15 4.0	1.4 2.5
25.0	0.90	2.5 3.15 4.0 6.3	—

5.3 For Type C

Composite steel bandsaw blades shall have the following dimensions:

All dimensions in millimetres.

Width <i>b</i>	Thickness <i>t</i>	Pitch <i>P</i> for Regular Tooth, Raker Set
(1)	(2)	(3)
19.0	0.80	2.5 3.15 4.0
25.0	0.90	2.5 3.15 4.0 6.3
31.5	1.06	4.0 6.3
37.5	1.25	4.0 6.3
50.0	1.25	4.0 6.3

5.4 For Type D

Friction cutting bandsaw blades shall have the following dimensions:

All dimensions in millimetres.

Width <i>b</i>	Thickness <i>t</i>	Pitch <i>P</i> for Regular Tooth	
		Raker Set	Wavy Set
(1)	(2)	(3)	(4)
12.5	0.80		
16.0	0.90	1.4	1.4
19.0	0.90	2.5	
25.0	0.90		

6 TOLERANCES

Tolerance on the given dimensions shall be in accordance with IS 5030 (Part 2).

7 HARDNESS

7.1 All types of blades, except friction cutting bandsaw blades have a toothed edge which is harder than body below the gullets of the teeth which shall have hardness 760HV minimum and 900HV maximum.

7.2 The hardness of the blade body after heat treatment shall be as under:

- a) *Type A1*— For carbon steel, hard-edge, flexible-back, bandsaw blades: 264HV, *Min.*
- b) *Type A2* — For carbon steel, hard-edge, tempered back, bandsaw blades: 373HV, *Min.*
- c) *Type B* — For intermediate steel: 363HV, *Min.*
- d) *Type C* — Composite steel bandsaw blades: 363HV, *Min.*
- e) *Type D* — For friction cutting bandsaw blades: 373HV, *Min.*

8 GENERAL REQUIREMENTS

8.1 The teeth shall be cut regularly and clearly along one edge of the blade with positive, zero or negative radial rake.

8.2 The amount of teeth setting shall be uniform on either side and shall be within the limits of $\pm 0.05\text{mm}$.

8.3 The blades which are supplied ready for use shall be soundly joined by brazing or welding.

8.4 The blades shall be supplied in rolls of 30.5 m length.

9 WORKMANSHIP AND FINISH

Bandsaw blades shall be of uniform thickness, free

from burrs, rust, scale and other defects. Sharp corners of the back-edge shall be removed.

10 PROTECTIVE COATING

Each bandsaw blade shall be covered by suitable rust proofing material or painted to avoid rusting and then wrapped in non-absorbent paper.

11 SAMPLING

11.1 The sampling and criteria of acceptance shall be in accordance with IS 7778 (Part 8).

11.2 Unless otherwise agreed to between the manufacturer and the purchaser, the sampling plan as given in Annex A shall be followed.

12 TESTS

12.1 Flexibility Test

The bandsaw blade of any type shall be bent round the whole circumference of a test piece of 63mm diameter as shown in Fig. 2. The bandsaw blade when released, with the exception of hardened portion, shall be capable of being straightened again without fracture.

12.2 Cutting Test

12.2.1 Test Material

Internal diameter 100 mm, mild steel seamless pipe of Grade A with wall thickness given in the table to satisfy the Three Teeth Rule.

12.2.1.1 Hardness of the test material shall be 45 to 50HRA (200 to 264HV).

12.2.2 One coil to be tested for 10 cuts on the following test material on the same saw machine. Total time of ten cuts should not exceed as given below in the table.

After 10 cuts, no teeth should be ripped (that is, teeth tip should not break).

<i>Saw Pitch mm</i>	<i>Wall Thickness of Pipe mm</i>	<i>Total Cutting Time s</i>
0.8	3.0	1 000
1.0	3.0	1 000
1.4	4.2	1 410
1.8	5.4	1 822
2.5	7.5	2 556
3.2	9.5	3 270
4.2	12.5	4 365
6.3	19.0	6 837

NOTE — Speed and feed rate can be used as per the recommendation from manufacturer of bandsaw cutting machine.

13 DESIGNATION

13.1 A metal cutting bandsaw blade of Type A1 with regular tooth (Raker set) having width $b = 12.5$ mm, thickness $t = 0.63$ mm and pitch $P = 2.5$ mm made of low alloy steel conforming to this standard shall be designated as:

Bandsaw blade A1 12.5 × 0.63 × 2.5 Regular Tooth (Raker Set) IS 5030 (Part 3)

13.1.1 If metal cutting bandsaw blade is required with skip tooth or hook tooth, these words as appropriate shall be added in place of regular tooth (Raker set) in the designation.

13.2 A metal cutting bandsaw blade of Type B with regular tooth (Wavy set) having width $b = 19.0$ mm, thickness $t = 0.80$ mm and pitch $P = 1.4$ mm made of low alloy steel and to this standard shall be designated as:

Bandsaw blade B 19.0 × 0.80 × 1.4 Regular Tooth (Wavy set) IS 5030 (Part 3)

13.2.1 If a metal cutting bandsaw blade is required with skip tooth or hook tooth, these words as appropriate, shall be added in place of regular tooth (Wavy set) in the designation.

14 MARKING

14.1 Each blade shall be highly and indelibly marked

with the type, size, tooth shape/set, symbol for material and manufacturer's name, initial or trade-mark.

Example

A metal cutting bandsaw blade of Type C having width $b = 25.0$ mm, thickness $t = 0.90$ mm and pitch $P = 4.0$ mm of regular tooth (Raker set) and made of high speed steel (HS) shall be marked as:

C 25.0 × 0.90 × 4.0 Regular Tooth (Raker Set) HS

NOTE — The blades having width less than 9.5 mm, may be marked with the desired information at the ends of the roll of blades.

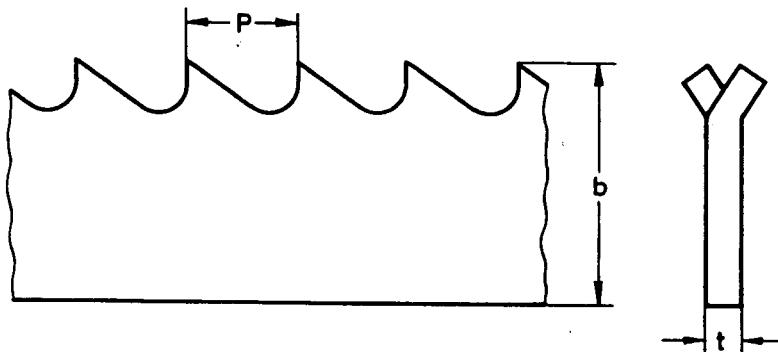
14.2 BIS Certification Marking

Each bandsaw blade may also be marked with the Standard Mark.

14.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made there under. The details of conditions under which the license for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

15 PACKING AND PACKAGING

A number of bandsaw blades of same type shall be packed as rolls in a carton bearing the size, number, designation and the manufacturer's name and/or trade-mark.



NOTE — The figure is indicative of dimensions only and does not specify design features.

FIG. 1 BASIC DIMENSIONS

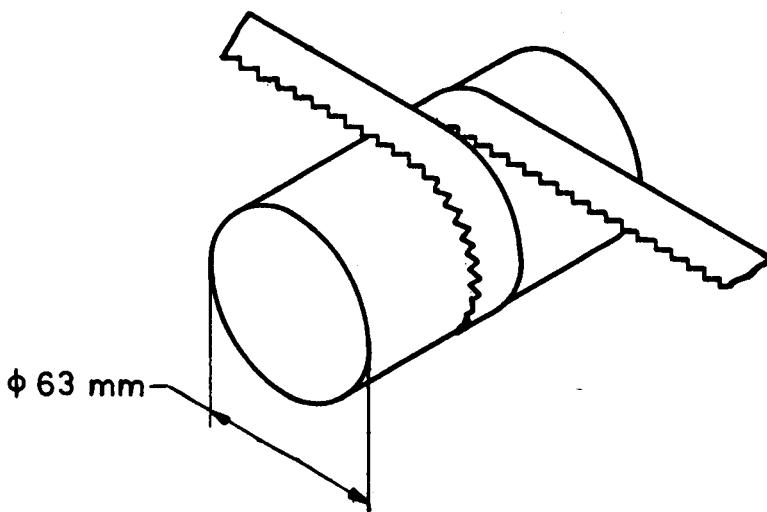


FIG. 2 FLEXIBILITY TEST

ANNEX A
(Clause 11.2)
SAMPLING

A-1 LOT

In any consignment, the bandsaw blades of the same type and size manufactured under similar conditions shall constitute a lot.

A-1.1 For ascertaining the conformity of the lot to the requirements of this specification samples shall be examined from each lot separately. The number of bandsaw blades to be selected from a lot shall be in accordance with col 1 and col 2 of Table 1. To ensure the randomness of selection, IS 4905 shall be used.

A-2 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

A-2.1 The blades selected according to **A-1.1** shall be examined for hardness, dimensions and tolerances, workmanship and finish, Cutting test, flexibility test and general requirements. Any bandsaw blade failing to meet the requirements for one or more of the characteristics shall be declared defective.

A-2.1.1 The lot shall be considered conforming to the requirements of above characteristics, if the number of blades found defective is less than or equal to the corresponding number given in col 3 of Table 1 for Class A non-conformity and in col 4 of Table 1 for Class B non-conformity as given in IS 7778 (Part 8).

Table 1 Sample Size and Permissible Number of Defectives
(Clause A-1.1)

Sl No.	Lot Size	Sample Size	Permissible Number for Class A Non-conformity	Rejection for Class B Non-conformity
(1)	(2)	(3)	(4)	(5)
i)	Up to 100	5	0	0
ii)	101 to 150	8	0	0
iii)	151 to 300	13	0	1
iv)	301 to 500	20	1	2
v)	501 to 1 000	32	1	3
vi)	1 001 and above	50	2	5

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Amendments Issued Since Publication

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